paper, that quaternion methods may be regarded practically as a particular case of octonion methods.

When the motion of the rigid body is always in the neighbourhood of an absolutely stable position we get the theory of "Screws." The more general theorems in connection with this are given in a somewhat different form from Sir Robert Ball's. Thus, for instance, we have a "generalised force motor," which in a particular case becomes the "reduced wrench." It is pointed out that the latter is not always intelligible. Some form of the former is always intelligible, as also is a particular form of it called the "virtual force motor." The corresponding "virtual impulse motor" is the impulse motor due to the external impulses and the reactions of the constraints, but a similar statement does not hold for the virtual force motor

IV. "On the Formation and Structure of Dental Enamel." By J. Leon Williams, D.D.S., L.D.S. Communicated by Professor Schäfer, F.R.S. Received December 4, 1894.

(Abstract.)

The special points in the formation and structure of enamel which I have attempted to elucidate in this paper may be summarised as follows:—

1st. The existence of a very thin membrane, or a structure of membrane-like appearance, lying between the ameloblasts and the forming enamel, and also between these cells and those of the stratum intermedium. I have also, in many specimens, seen a similar membrane covering the odontoblasts.

2nd. The formation of enamel by deposit and not by cell calcification. This deposit probably consists of two distinct cell products—a granular plasm and spherules of calcoglobulin.

3rd. The relation of the cells of the stratum intermedium to true secreting tissue; this relation being especially marked in the enamel organs of the rat and mouse.

4th. An intricate vascular network in the stratum intermedium. I should also mention that I have seen a free distribution of blood vessels in the odontoblastic layer of cells in the mouse, rat, and calf, as well as in human embryos, thus conclusively proving that these cells are not calcified.

5th. The fibrous character of enamel in many of the lower animals, and the change of these fibres into more or less regularly arranged granules in the monkey and in man.

6th. That the varicosities of the enamel rods are not caused by acids (although often rendered more clear to view by acid treatment)

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but represent a true structural peculiarity of this tissue. That these varicosities, which often continue in an uninterrupted line across large fields of view, correspond with the course of one set of fibres. The varicosities may, therefore, be caused by the presence of this set of cross fibres. The only alternative explanation which has occurred to me is that there may be a rhythmic, simultaneous action of all the ameloblasts concerned in the deposit of the material for enamel building. The last theory seems to be less reasonable than the first.*

7th. The Retzius bands are often as distinctly marked in forming as in mature teeth, and in teeth which have been kept constantly moist as they are in dried specimens. The enamel rods are often seen to pass without break across several of these bands. The bands are principally due to a deposit of pigment, and not to imprisoned air or gas as claimed by von Ebner.

V. "The Healing of Incisions in Vegetable Tissues." By SAMUEL G. SHATTOCK. Communicated by Sir JAMES PAGET, Bart., F.R.S. Received December 4, 1895.

(Abstract.)

The five methods of wound repair in man and the higher animals :—

(1) Immediate union. (2) Primary adhesion. (3) Granulation. (4) Secondary adhesion. (5) Beneath a scab.

The third and fifth concern the healing of *open* wounds, and are referred to only incidentally.

IMMEDIATE UNION, *i.e.*, union of the cells actually divided.—Never observed. Experiments made on the planule of *Faba vulgaris*.

PRIMARY ADHESION.—All growing parenchyma readily heals after incision. Mode of experiment.

(A) Healing by primary adhesion without separation of surfaces.

(1) Without sclerosis of the scar-tissue. In the shoots of *Aucuba*. Stages: Cell division on either side of the incision; absence of suberisation; interruption of the line of the adpressed remains of the opened cells by the interpolation of new. The absence of cork formation not due to inability to form it.

(2) With sclerosis of the scar-tissue. In kohl-rabi. The line of scar-tissue broken by the growth of indifferent parenchyma.

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* Since the above was written, I have demonstrated that there is a simultaneous deposit of the spherical bodies over the entire surface of forming enamel.—J. L. W.